PL 696 relinquishment report

Parts of blocks 7020/1, 7020/2, 7020/3, 7120/11, 7120/12, 7121/1, 7121/10

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1 Key license history

License: PL696 – Parts of blocks 7020/1, 7020/2, 7020/3, 7120/11, 7120/12, 7121/1, 7121/10 (Figure 1)

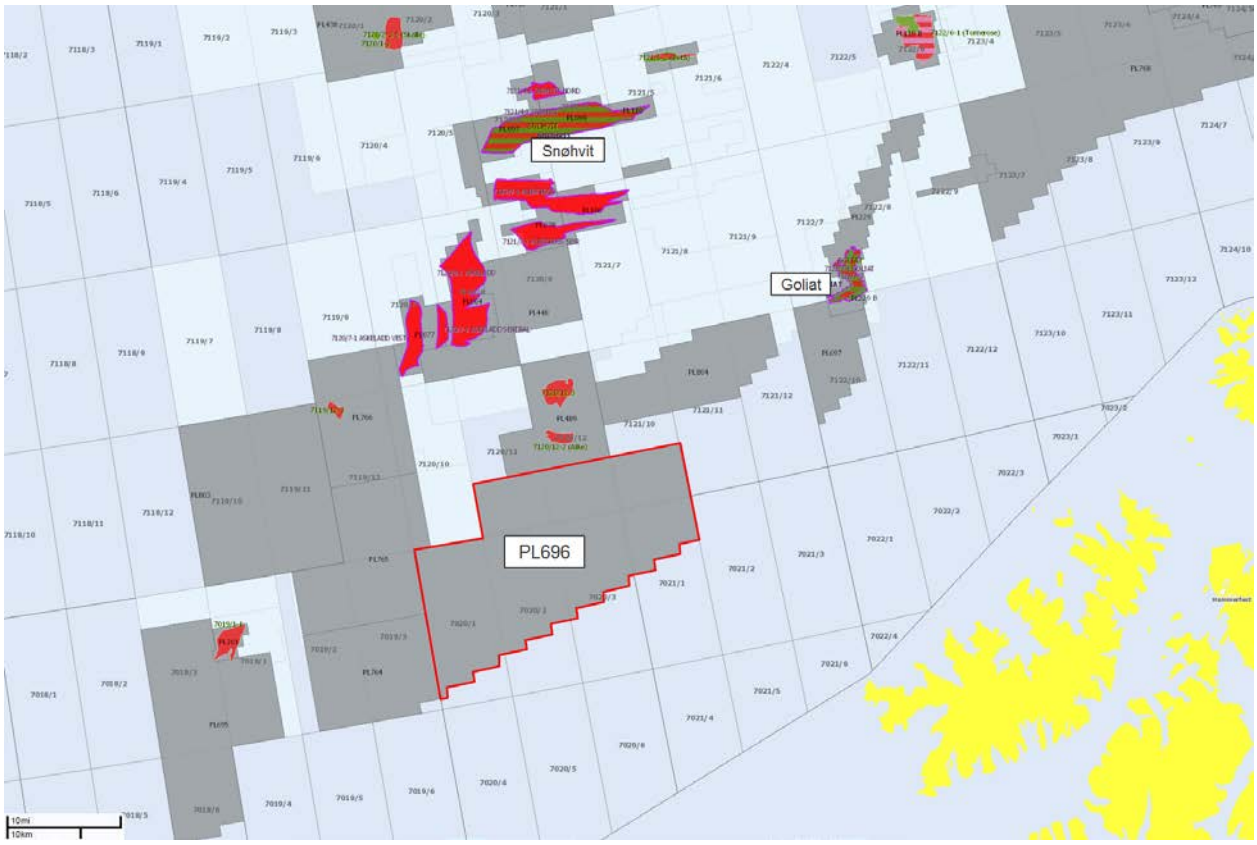

Figure 1: Area map with licenses, Snøhvit and Goliat fields, and surrounding discoveries.

Awarded: February 08.02.2013 (awarded in the 2012 APA)

License period: Expires 08.02.2021 (Initial period: 8 years)

License group:

Statoil Petroleum AS	50% (Operator)
Eni Norge AS	30%
Petoro AS	20%

License area: 1129.486 km^2

Work programme: Technical G&G work: Fulfilled, confirmed by the NPD
Acquire 3D seismic: Fulfilled, confirmed by the NPD
Drill or drop by 08.02.2016, three years after award

Work performed:

2013:	License awarded and license start-up. The license purchased approximately 1100 km^2 of 3D seismic data covering the PL 696 license area in 2013, the FP13 survey acquired by CGG between March and June 2013. Fast track seismic was delivered in August 2013.
2014:	Seismic interpretation, evaluation of the prospectivity.
2015:	Seismic interpretation and evaluation of the prospectivity of the license area. Geochemical study of well data.
2016:	Drop

Meetings:

EC/MC - Start-up of license:	04.04.2013
EC/MC - Status interpretation:	29.11.2013
EC/MC - Status interpretation:	08.12.2014
EC/MC - Prospectivity summary:	23.10.2015

Reason for relinquishment

Based on the technical evaluation which has been carried out, none of the mapped prospects within the license have a resource potential of economic interest.

2 Database

Wells

The well database in PL696 is given in Table 1. The wells 7120/12-2, 7120/12-4 were used as analogues for the upper part of the prospective section, while the 7128/4-1 and 7128/6-1 wells were considered as analogues for the lower prospective part in the license.

Well	Year	Age TD	Content
7019/1-1	2000	Early Jurassic	Gas
7119/9-1	1984	Late Triassic	Dry
7119/12-1	1980	Early Jurassic	Oil Shows
7119/12-2	1981	Late Triassic	Shows
7119/12-3	1983	Late Triassic	Gas/Condensate
7119/12-4	2011	Late Triassic	Dry
7120/1-2	1989	Late Triassic	Oil
7120/2-2	1991	Mid Jurassic	Oil Shows
7120/2-3	2011	Late Triassic	Gas
7120/7-1	1982	Late Triassic	Gas
7120/7-2	1983	Early Jurassic	Gas/Condensate
7120/8-1	1981	Late Triassic	Gas/Condensate
7120/8-2	1982	Late Triassic	Gas
7120/8-4	2007	Late Triassic	Dry
7120/9-1	1982	Late Triassic	Gas
7120/9-2	1984	Late Permian	Gas
7120/10-1	1984	Late Triassic	Dry
7120/10-2	1990	Late Jurassic	Dry
7120/12-1	1980	Late Triassic	Shows
7120/12-2	1981	Pre-Devonian	Gas/Condensate
7120/12-3	1983	Late Triassic	Gas
7120/12-4	1984	Early Permian	Dry
7120/12-5	2011	Mid Triassic	Dry
7121/1-1	1985	Late Carboniferous	Dry
7121/7-2	1986	Late Triassic	Gas
7121/9-1	2011	Mid Jurassic	Dry
7122/7-1	2000	Late Triassic	Oil
7122/7-2	2001	Triassic	Oil
7122/7-3	2006	Permian	Oil/Gas
7122/7-4S	2006	Early Triassic	Oil/Gas
7122/7-5	2006	Early Triassic	Dry
7124/3-1	1987	Late Carboniferous	Oil/Gas
7125/1-1	1088	Mid Jurassic	Oil/Gas
7125/4-1	2007	Early Triassic	Oil/Gas
7125/4-2	2008	Early Triassic	Oil
7128/4-1	1994	Pre-Devonian	Oil/Gas
7128/6-1	1991	Pre-Devonian	Oil Shows
7219/8-1	1992	Early Jurassic	Dry
7220/6-1	2005	Pre-Devonian	Oil Shows
7226/11-1	1988	Pre-Devonian	Gas

7227/11-1A	2006	Early Permian	Shows
7228/7-1S	2001	Early Permian	Dry
7228/9-1S	1990	Early Permian	Oil/Gas Shows
7229/11-1	1993	Carboniferous	Dry

Table 1: Well database in PL696.

Seismic

The common license database was approved at the ECMC meeting No 1. The seismic data that was utilized in the technical evaluation of PL 696 are shown in Figure 2, and comprise the 3D seismic FP13 (1100km^2), together with 2D lines.

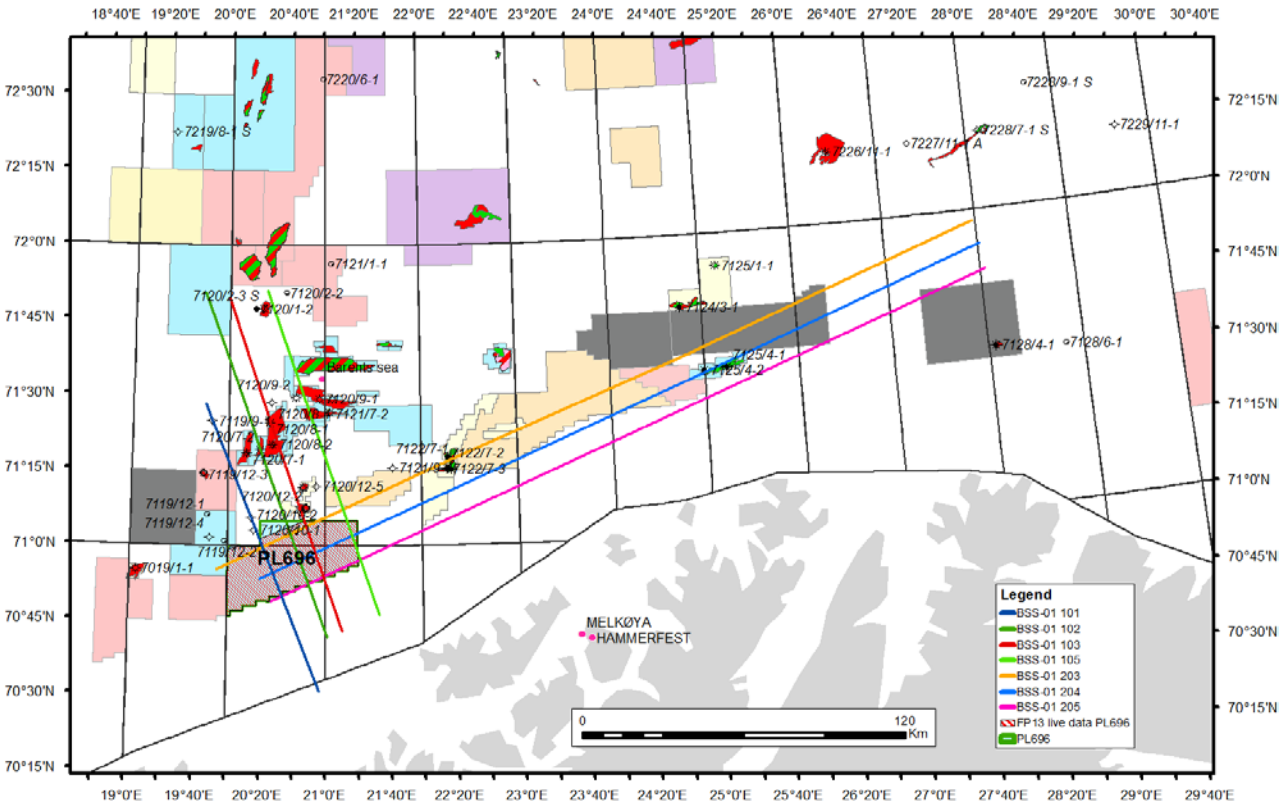

Figure 2: Common database with 2D lines, wells and 3D survey over license.

3 Review of geological framework

A regional geological framework was described in TFO application from 2012. No geological studies have been performed beside evaluation of prospectivity at all stratigraphic levels within the license area, which is summarized in Chapter 5. The license has initiated a geochemical study to re-evaluate shows and hydrocarbon indications in 12 wells surrounding the license (7019/1-1, 7119/12-1, 7119/12-2, 7119/12-3, 7119/12-4, 7120/10-1, 7120/10-2, 7120/12-1, 7120/12-2, 7120/12-3, 7120/12-4 and 7120/12-5).

The area was considered to be an immature exploration province, where the main concepts described in the TFO application in 2012 was based on 2D mapping. No detailed mapping of prospects was performed due to lack of data coverage. The interest for the area was driven by the possibility of 3D seismic interpretation of the area could de-risk the prospectivity and play concepts (Figure 3).

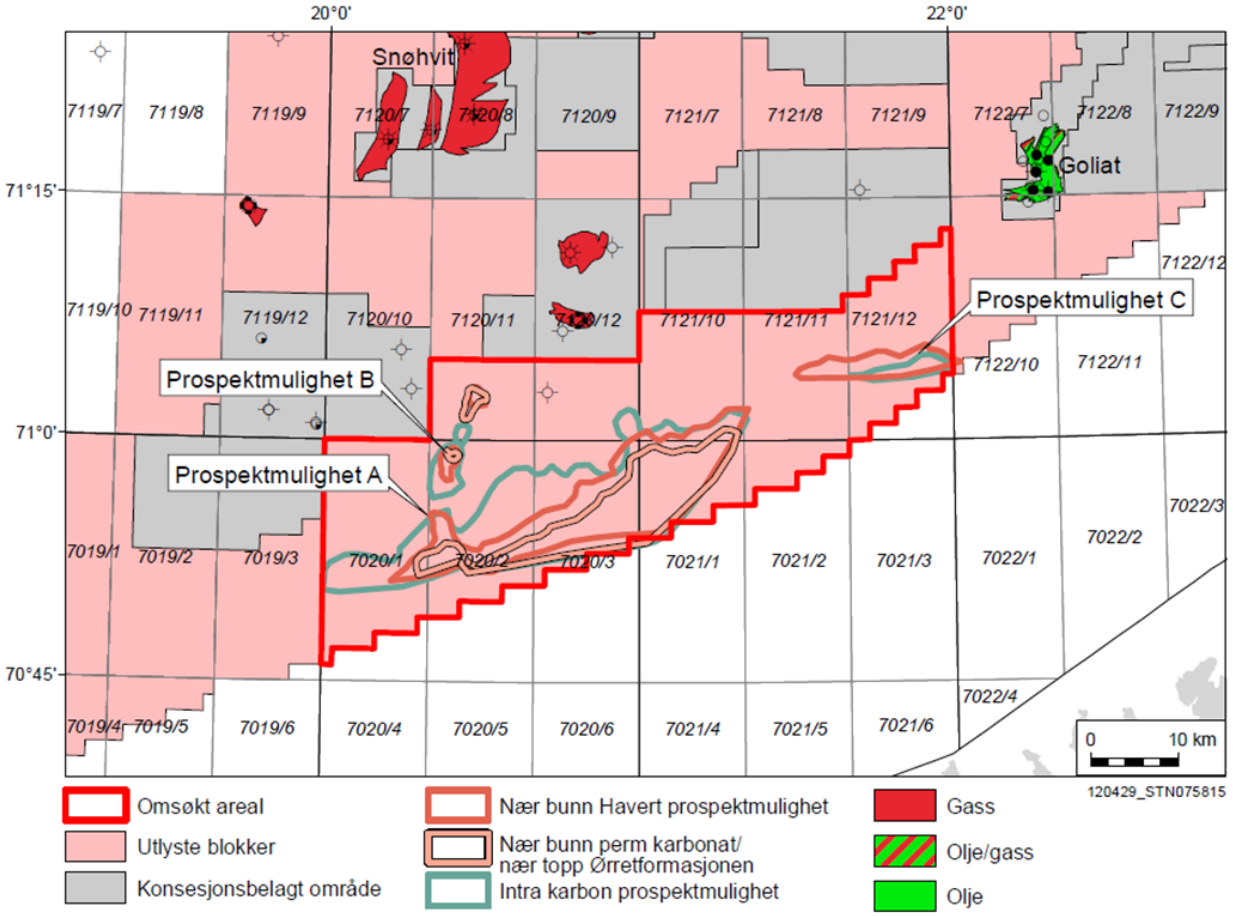

Figure 3: Original mapped prospective opportunities within the PL 696.

PL696 is located on the western part of the Finnmark Platform, where the area is limited to the north by the Troms-Finnmark Fault Complex and the Norwegian mainland in the South. The sedimentary

packages on the platform are of Quaternary to Carboniferous age (Figure 4); also Devonian deposits could be present in the area (Larssen et al 2005).

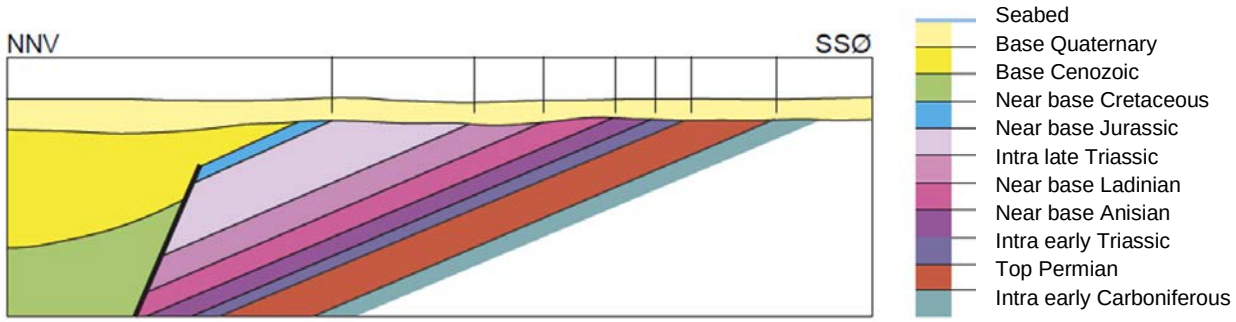

Figure 4: Sketch illustrating strata present on the Finnmark Platform within PL 696.

The regional seal in the area is Permian, Carboniferous and Triassic shales, and source is of Hekkingen Fm. and Steinkobbe Fm. equivalent in the Hammerfest Basin, where long-distance migration from the Hammerfest Basin is assumed onto the Platform. Reservoirs are sandstone of Permian and Carboniferous age.

Play levels and models identified in the application ranged from the basement to the Triassic section within the applied blocks on the Finnmark Platform. The most prominent challenge detected in the area was the monoclinal structural setting of the platform, in which it is difficult to develop robust and low risk traps.

During the initial period, the license has identified one main play, and two conceptual secondary plays (Figure 5). The main play level is within the Permian Tempelfjorden Group. Within this interval, good quality sands of Ørret Fm. are proven in the 7120/12-4 well, and the seal in the play is spiculite carbonate and shales of the Røye Fm. The leads and prospects within this play have been evaluated based on the 3D seismic survey FP13, where detailed fault mapping and fault seal analysis have been carried out.

Secondary play levels consist of the Carboniferous strata within the Gipsdalen and Billefjorden Group. The Billefjorden group is a conceptual half-graben play formed in the Late Paleozoic. An analogue to this play could be the Billefjorden Trough on Spitsbergen. The leads identified in the lower plays are challenging to de-risk due to poor seismic imaging.

A lead in the Cretaceous section has been identified across the Troms-Finnmark Fault Complex in the Hammerfest basin.

No prospectivity was identified within the Triassic section.

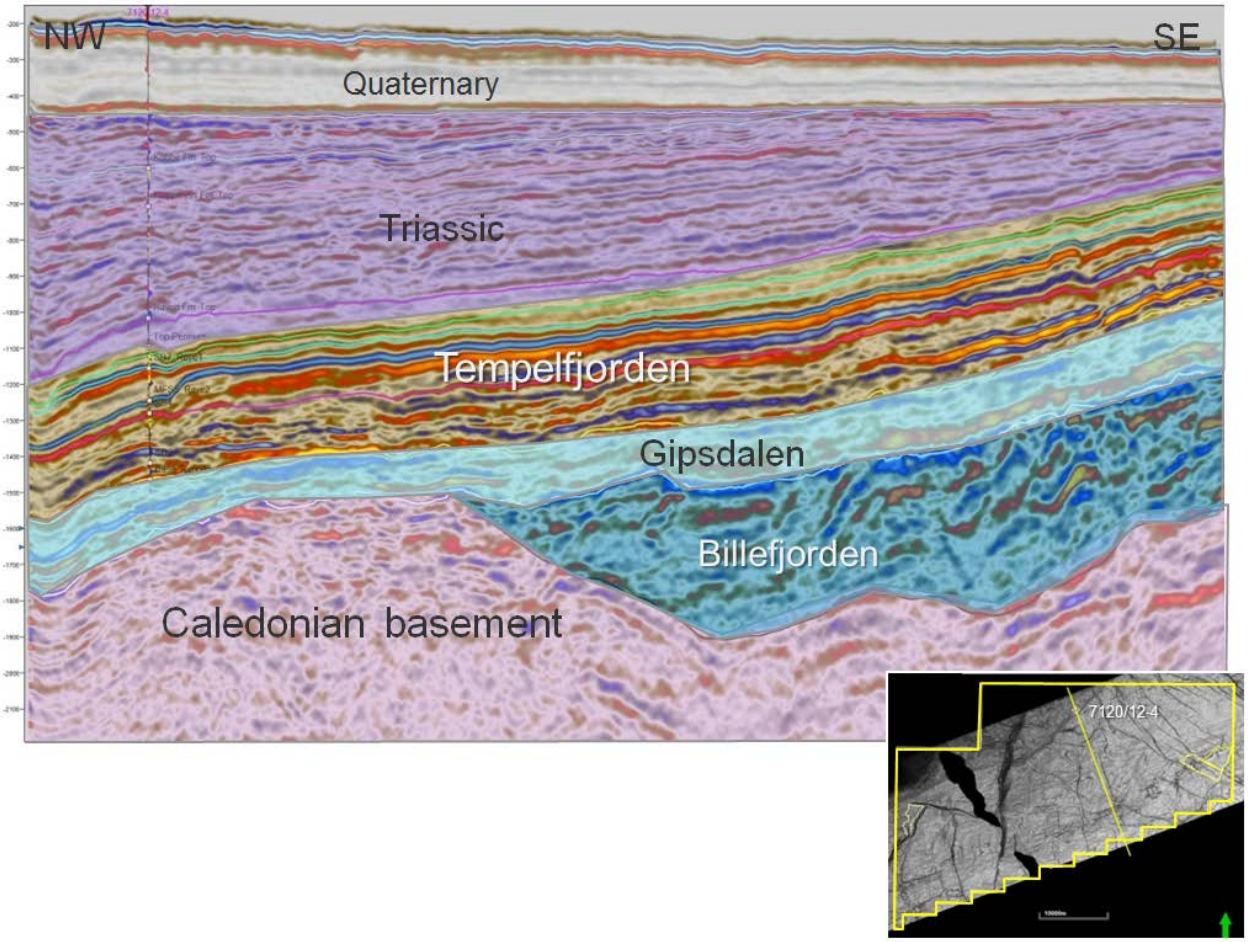

Figure 5: Seismic section through well 7120/12-4, illustrating play division on the Finnmark Platform.

4 Prospect update

PL696 was awarded based on conceptual prospectivity, where no detailed prospect mapping or evaluation was performed. In the license initial period prospects and leads has been identified and evaluated within the 3D seismic data survey. Overview of identified leads and prospects in the license is given in Figure 6.

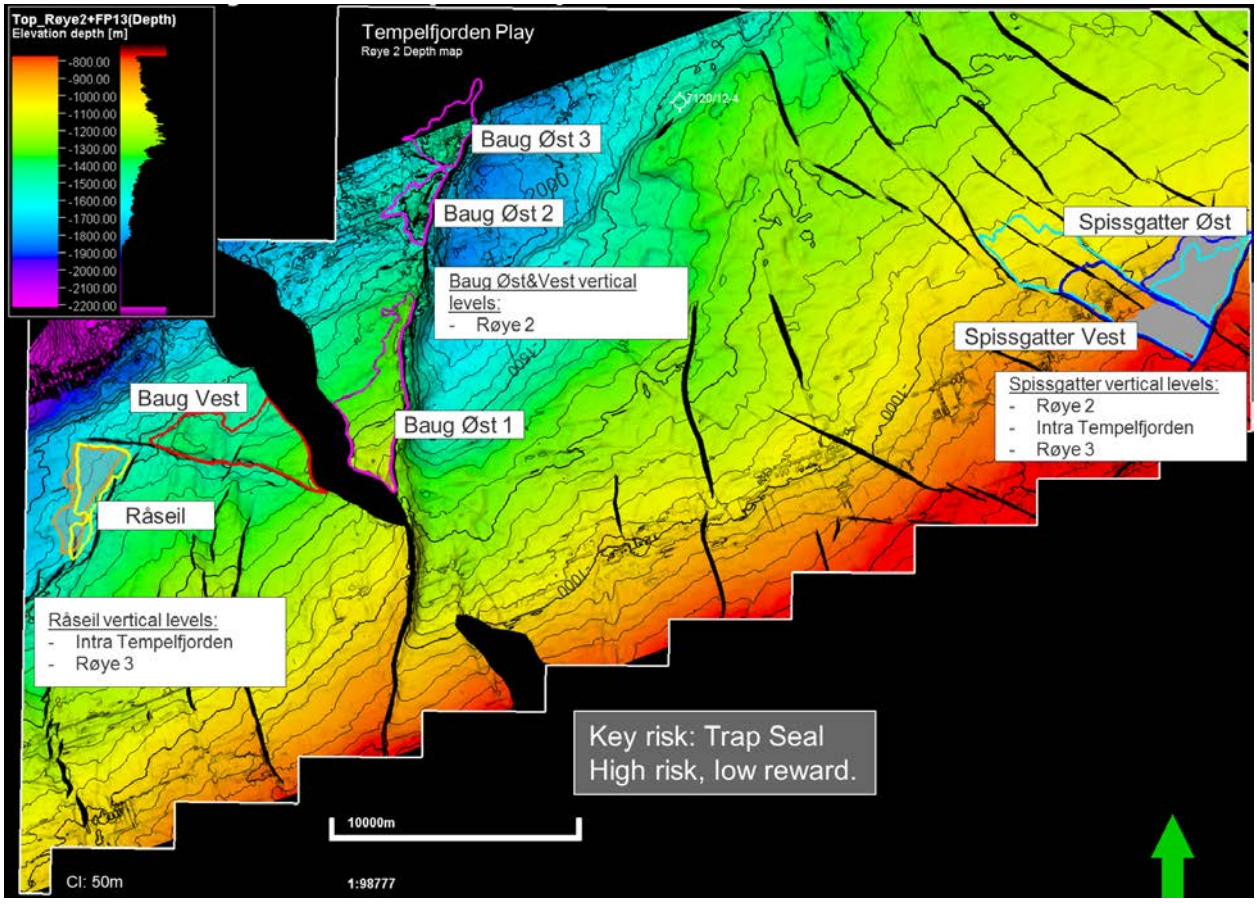

Figure 6: Structural depth map of Top Røye 2 with prospect outlines and number of vertical segments indicated.

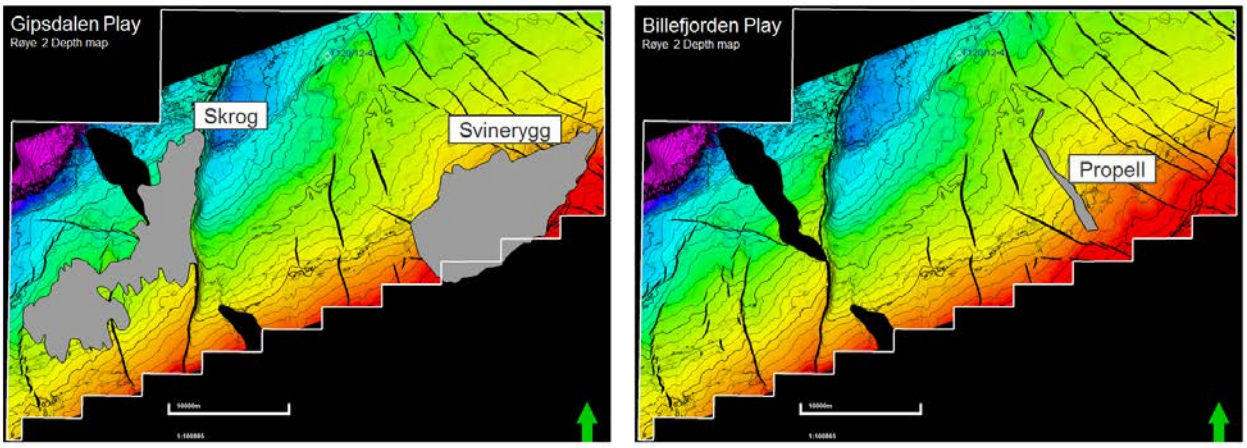

Figure 7: Outlines of Gipsdalen and Billefjorden leads against the backdrop of Røye 2 structural depth map.

Tempelfjorden Prospects

High confidence mapping of the Tempelfjorden play in PL696 resulted in prospects that can be characterised as high risk and low reward. Tempelfjorden prospectivity relies on a reservoir model where the Ørret siliciclastic reservoir thickens up-dip from the 7120/12-4 well towards the prospective areas. This model has taken well correlations, seismic mapping and regional paleogeograpic models into account. The three prospective levels are Røye 2, Intra Tempelfjorden and Røye 3, correlated with the 7120/12-4 well.

The evaluations of the prospects have been simplified by using constant N/G (0.7) and constant porosity (0.20).

Spissgatter

The prospect is located in the eastern part of PL696 and the trap is a down-faulted structure and comprises of two lateral segments (Øst and Vest), with 3 vertical segments each. Figure 8 illustrates the Spissgatter lateral segments, and the input and output of GeoX simulations are listed in Table 2. The key risk of this prospect is the trap seal, where the minimum fault throw is at apex.

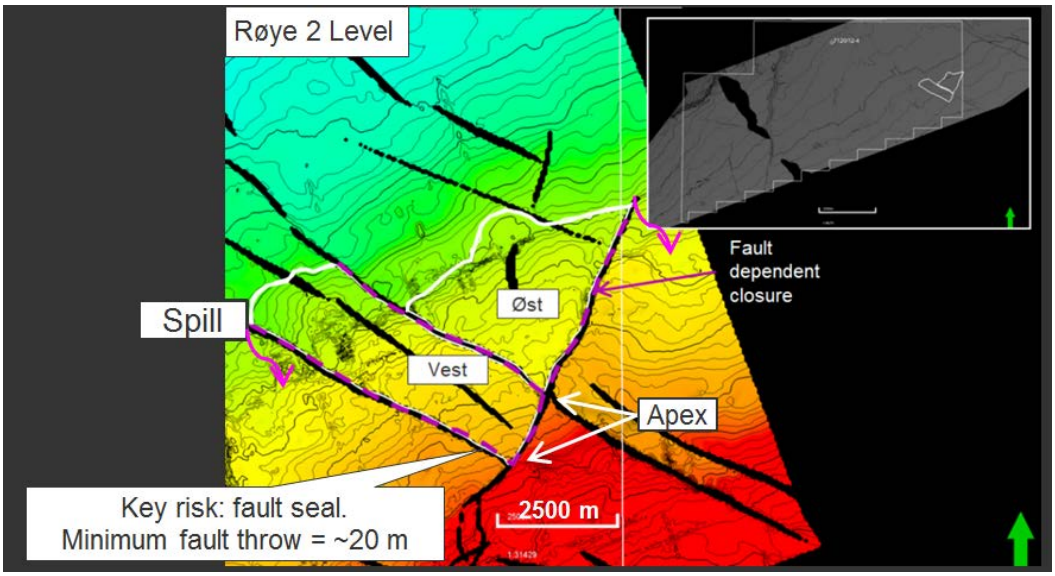

Figure 8: Røye 2 structural depth map covering the Spissgatter prospect, with apex and spill indicated.

Prospect	Segment	Probability				Resources				Apex [m]	Spill [m]	Mean HC column [m]
						Oil inplace		Oil Rec. (RF 30%)				
		Trap	Source	Reservoir	Pg	Mean	P10	Mean	P10			
Spissgatter Vest	Ørret 2,5	0.15	0.4	0.9	2.7 %	14.0	33.1	4.19	10.0	740	962	105
	Ørret 3	0.15	0.4	0.9	2.7 %	16.7	40.9	6.7	16.4	972	1285	148
	Ørret 3.5	0.15	0.4	0.9	2.7 %	3.84	7.6	1.15	2.29	1065	1227	86
Spissgatter Øst	Ørret 2.5	0.2	0.4	0.9	3.6 %	12.2	23.5	3.66	7.08	830	962	80
	Ørret 3	0.2	0.4	0.9	3.6 %	8.13	11.1	2.43	3.37	1067	1166	80
	Ørret 3.5	0.2	0.4	0.9	3.6 %	10.4	16.9	3.11	5.1	1176	1320	89

Table 2: Spissgatter prospects, oil volumes and risk.

Baug

The prospect lies on a structural ridge in the western part of the license area and comprises 4 separate prospects, all with single segments. Baug Vest & Baug Øst 1 is cut by a younger Triassic channel which is inferred to be mud filled and provides part of the lateral seal for the two prospects. Figure 9 and Figure 10 illustrate the location and geometry of the Baug prospects, and Table 3 has listed the input and output of GeoX simulations.

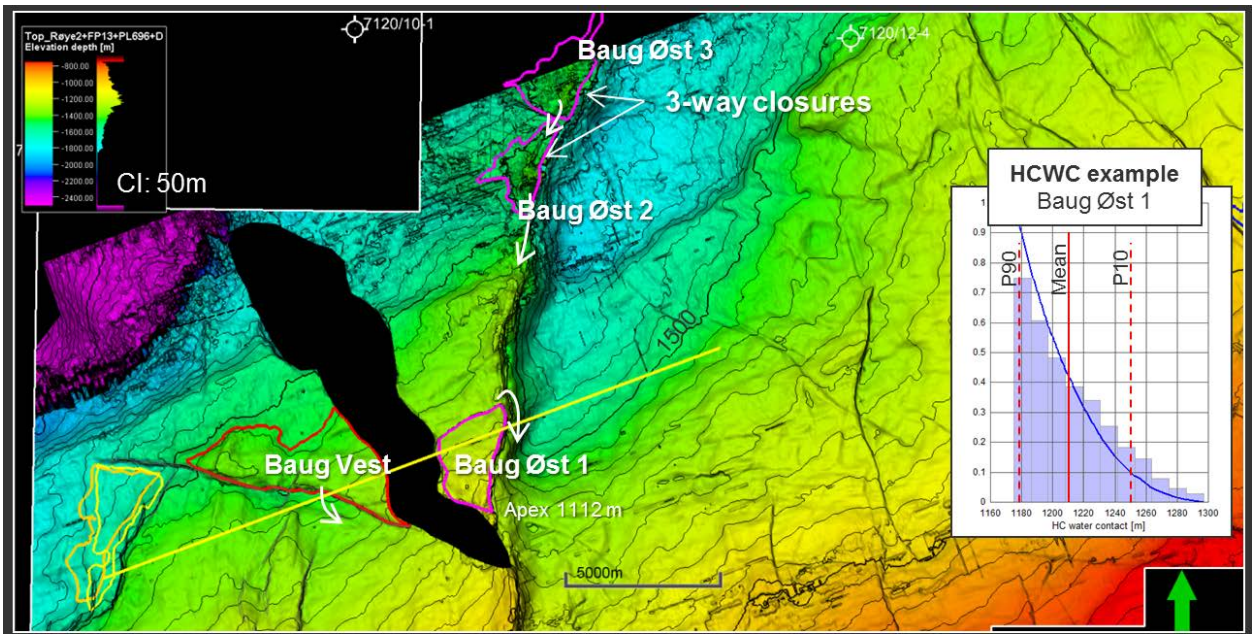

Figure 9: Røye 2 structural depth map, illustrating Baug closures. The prospects spill points and spill directions are indicated with white arrows.

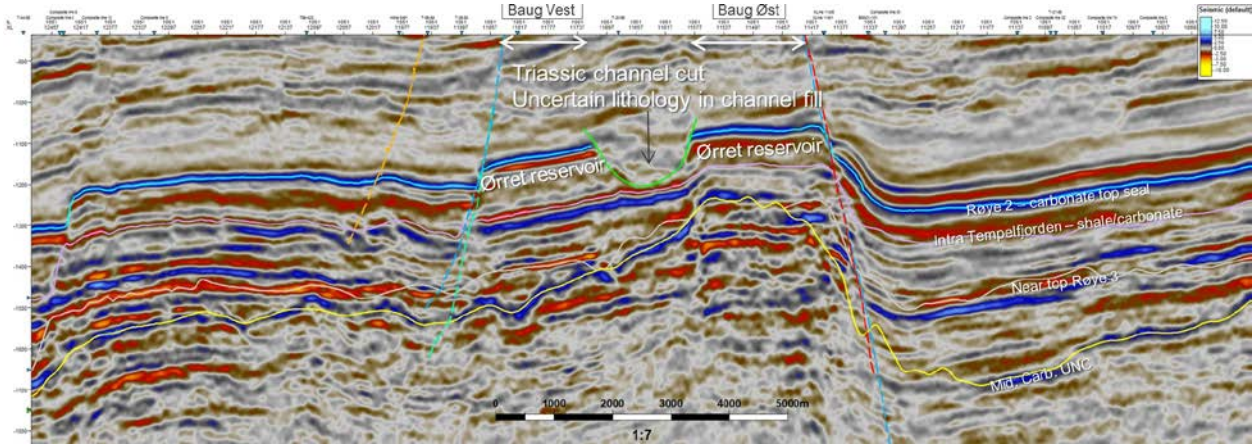

Figure 10: Seismic cross-section through Baug Vest and Baug Øst 1 illustrating the trap style.

Baug prospects	Vest		Øst 1		Øst 2		Øst 3	
P_{Trap}	0.3		0.3		0.35		0.35	
P_{Source}	0.5		0.5		0.5		0.5	
$P_{Reservoir}$	0.9		0.9		0.9		0.9	
Pg	6.8 %		6.8 %		7.9 %		7.9 %	
Mean oil volume [MSm^3] (inplace/rec.) RF 0.3	7.83	2.34	12	3.59	3.05	0.91	6.62	1.68
P10 oil volume [MSm^3] (inplace/rec.) RF 0.3	18.0	5.44	24	7.25	4.86	1.47	8.66	2.61
Apex [m]	1275		1112		1423		1408	
Spill [m]	1464		1297		1518		1522	
Mean HC column [m]	94		98		68		83	

Table 3: Baug prospects, oil volumes and risk.

Råseil

The prospect is a down-faulted trap in the western most part of PL696. It has two vertical segments within the Intra Tempelfjorden and Near top Røye 3/Gipsdalen (Figure 11 and Figure 12). Input and output from GeoX simulations are listed in Table 4.

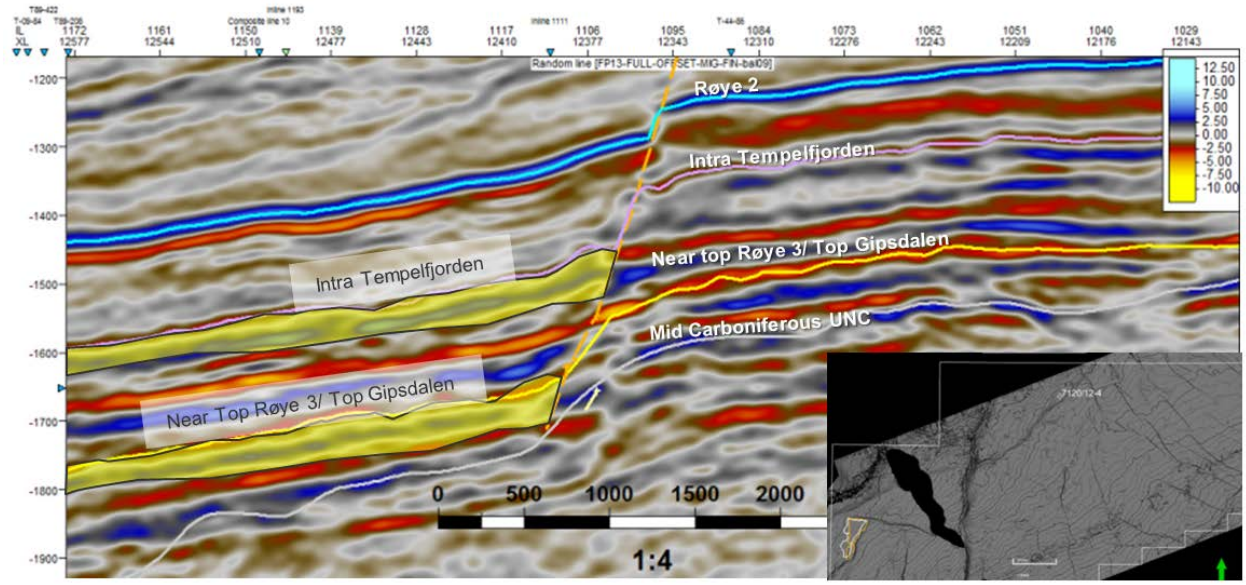

Figure 11: Cross section in seismic trough the vertical segments in Råseil, illustrating the two reservoir levels.

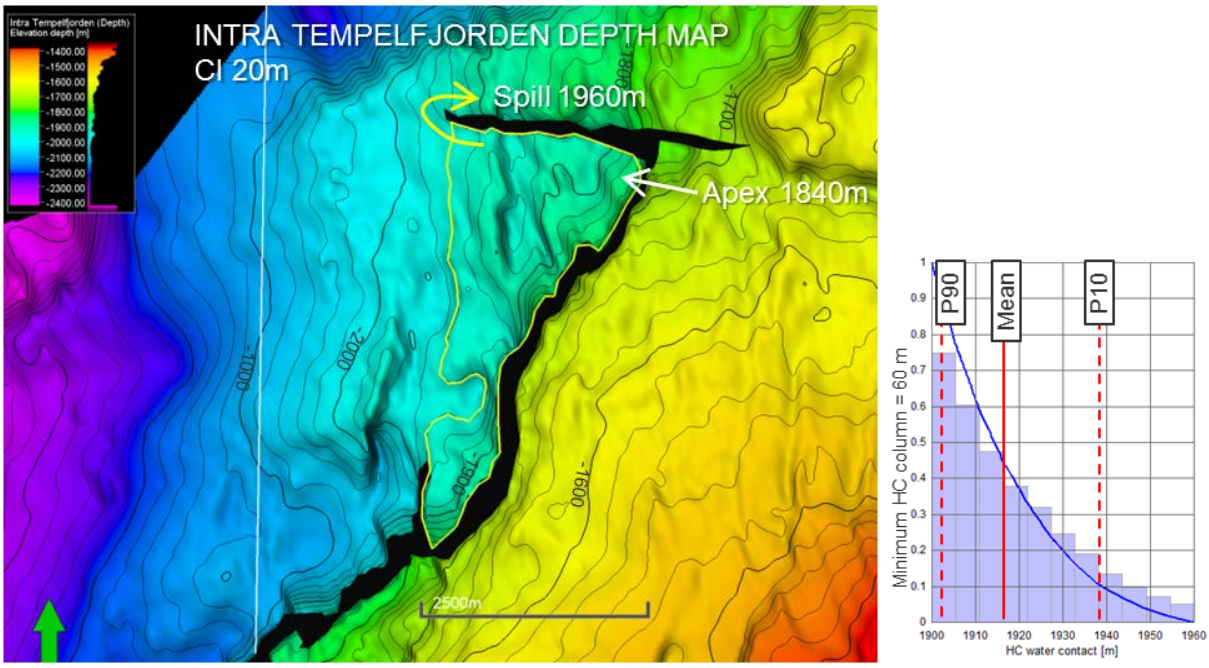

Figure 12: Intra Tempelfjorden structural depth map with the Råseil outline indicated in yellow. The trap is down-faulted and carries high risk from apex and down.

Råseil prospect	Ørret 3		Bjarmeland/Ugle Fm?	
P_{Trap}	0.4		0.3	
P_{Source}	0.45		0.45	
$P_{Reservoir}$	0.9		0.7	
Pg	8.1 %		6.3 %	
Mean oil volume [MSm^3] (inplace/rec.) RF 0.3	4.59	1.37	3.25	0.97
P10 oil volume [MSm^3] (inplace/rec.) RF 0.3	8.26	2.5	7.39	2.23
Apex [m]	1840		2163	
Spill [m]	1960		2321	
Mean HC column [m]	78		95	

Table 4: Råseil prospect, oil volumes and risk**.**

Gipsdalen/Billefjorden leads and prospects

Deeper play concepts have been developed in the Gipsdalen and Billefjorden Groups in PL696. The seismic data quality is poor for these deeper plays, and it is hard to de-risk the leads using the available seismic.

The 7120/12-4 well encountered 80 m of what is interpreted as the Ugle Fm within Gipsdalen Gp and TD of the well was set within this formation. Ugle Fm is evaluated as reservoir in the Gipsdalen Play. Long distance migration of Hekkingen sourced oil from the Hammerfest Basin is also assumed for this play.

Constant N/G (0.7) is assumed for this play due to low confidence.

Skrog and Svinerygg

Two large pinch-out traps have been mapped within the Gipsdalen play just above the Mid Carboniferous Unconformity.

Skrog is a prospect forming a proximal on-lap trap onto the Mid Carboniferous Unconformity (Figure 13). The input and output of GeoX simulations have been listed in Table 5.

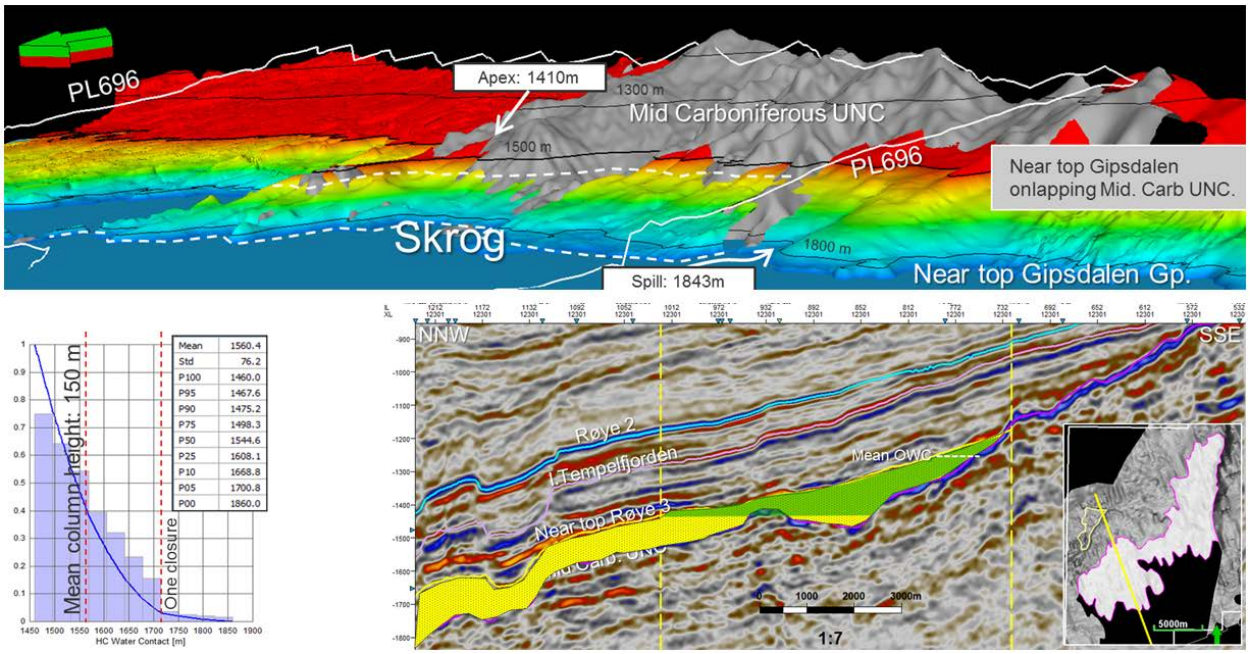

Figure 13: Structure map of Near Top Røye 3 onlapping Mid Carboniferous Unconformity, and seismic section illustrating the Skrog prospect onlap trap.

Skrog		
P_{Trap}	0.2	
P_{Source}	0.45	
$P_{Reservoir}$	0.7	
Pg	3.2 %	
Mean volume [MSm^3] (inplace/rec.) RF 0.3	36.9	11.1
P10 volume [MSm^3] (inplace(rec.) RF 0.3	90.3	27.1
Apex [m]	1410	
Spill [m]	1843	
Mean HC column [m]	150	

Table 5: Skrog prospect, oil volumes and risk.

Svinerygg is a lead located entirely within the license. Trap definition is challenging with the pinch-out line partially extending south of the seismic data extent and license boundary (Figure 14).

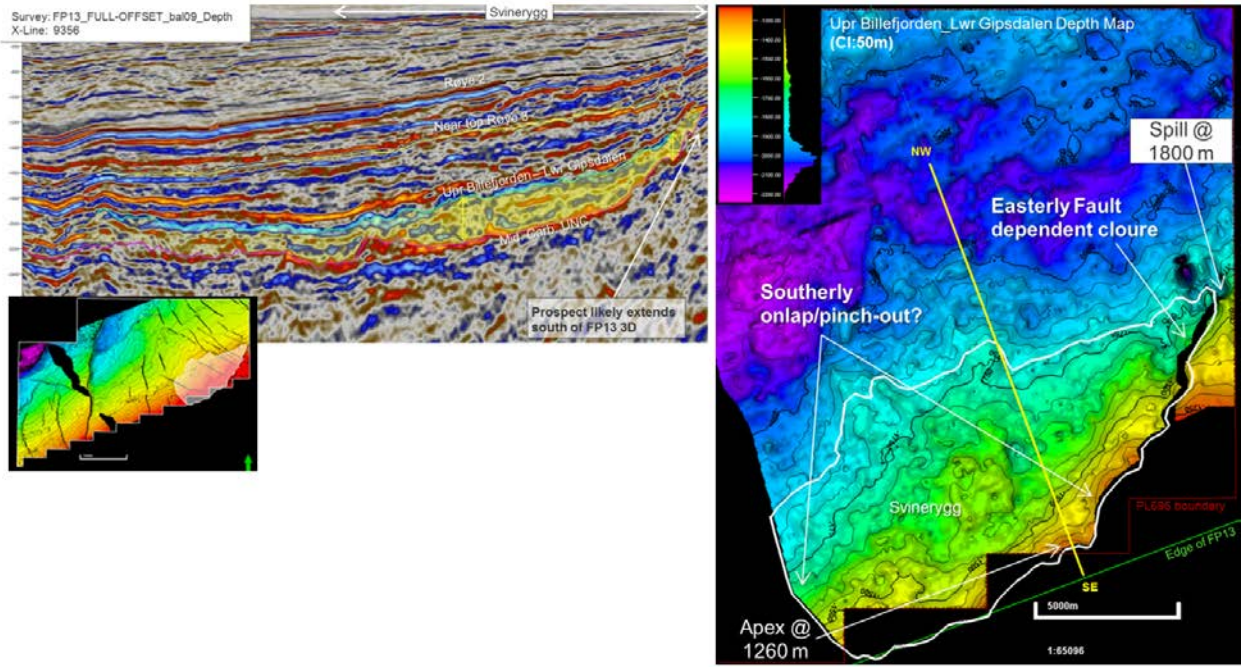

Figure 14: Seismic cross-section and structure map of top reservoir of Svinerygg.

The Billefjorden Play, which is a conceptual half-graben play, relies upon a 'self-contained' Carboniferous petroleum system, consisting of source rock within the Tettegras Fm. (which is proven locally oil prone in the eastern Finnmark Platform by the 7128/6-1 well, as well as in an analogue equivalent on Svalbard) and the intra-rift Soldogg Fm and Blærerot Fm siliciclastic reservoir (which is proven to be a good reservoir in well 7128/6-1). Due to poor seismic data quality within the half-grabens, trap and reservoir definition is challenging.

Constant N/G (0.7) is assumed for this play due to low confidence.

Propell is a lead that has been identified within the conceptual Billefjorden play and is located in the eastern part of PL696. Propell is a truncation trap against the Mid Carboniferous Unconformity (Figure 15).

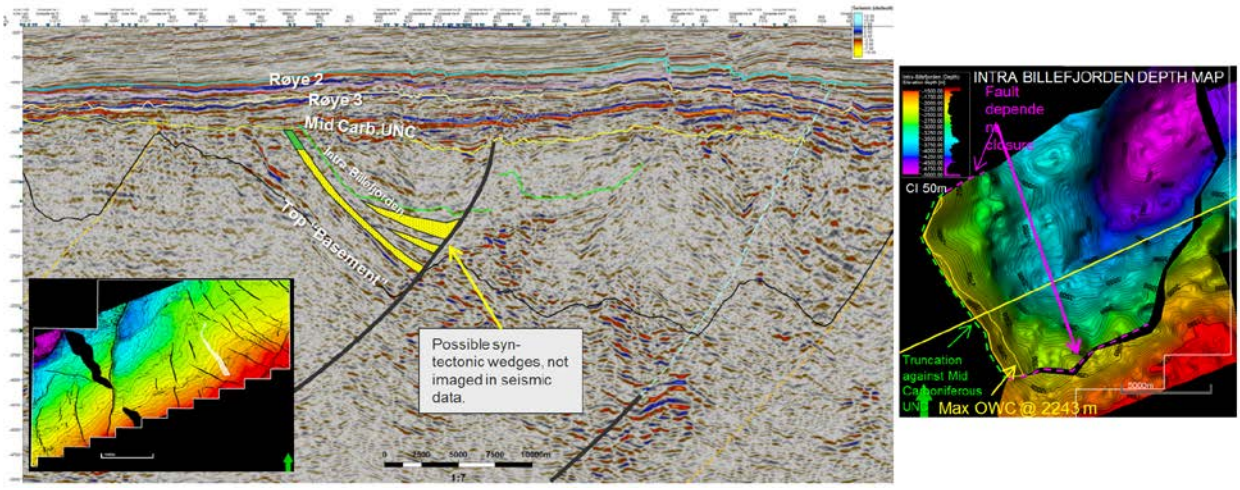

Figure 15: Seismic cross-section and structure map of top reservoir of Propell lead, with possible reservoir illustrated on seismic.

5 Technical evaluations

The eastern part of PL696 is situated 45 km south-west of the Goliat oil and gas field, within tie-back range, whereas prospects within the western part of PL696 would require a jacket development solution. Two field development solutions have therefore been considered with oil to Goliat. A subsea tie back solution with no gas processing (requires low GOR oil), is feasible in the eastern part of PL696 closer to the Goliat Field. Alternatively, a more likely solution is a jacket development with gas handling and oil stripped of gas before export, considering that most of the prospectivity is located at distances >50km from the Goliat Field. Minimum economical oil volumes for these development solutions range from 8.1 MSm^3 (BE @ 64 USD) for a subsea tieback to 14.1 MSm^3 (BE @ 68 USD) for a jacket development with oil export.

Based on the thorough technical evaluation which has been carried out, none of the mapped prospects within the license has a resource potential which is above the MEV required to have a positive ENPV for the partnership.

6 Conclusions

The Finnmark Platform forms an overall monocline dipping towards the Hammerfest Basin, resulting in the absence of 4-way closures or robust structural closures. Most traps are either complexly down-faulted or stratigraphic in nature, with prospect Pg's ranging from 1% to 16%. Consequently, the majority of prospectivity within PL696 can be considered as high risk and low reward (Table 6), where the mapped prospects do not hold economical volumes. Based on this, the partnership has made the decision to drop the license.

Block nr.	Prospect segments	P-Prospect/Segment							Discovery	Volume (recoverable 30%) MSm³ oil		
		Reservoir		Source			Trap					
		pre-sence	produc-ability	pre-sence	migra-tion	hc-phase	geo-metry	seal	Pg	P90	Mean	P10
7021/1	Spissgatter Vest - Ørret 2.5	0.90	1.00	1.00	0.40	0.50	1.00	0.15	0.027	0.76	4.19	10
7071/1	Spissgatter Vest - Ørret 3	0.90	1.00	1.00	0.40	0.50	1.00	0.15	0.027	1.25	6.7	16.4
7021/1	Spissgatter Vest - Ørret 3.5	0.90	1.00	1.00	0.40	0.50	1.00	0.15	0.027	0.48	1.15	2.29
7021/1	Spissgatter Øst - Ørret 2.5	0.90	1.00	1.00	0.40	0.50	1.00	0.20	0.036	1.59	3.66	7.08
7021/1	Spissgatter Øst - Ørret 3	0.90	1.00	1.00	0.40	0.50	1.00	0.20	0.036	1.67	2.43	3.37
7021/1	Spissgatter Øst - Ørret 3.5	0.90	1.00	1.00	0.40	0.50	1.00	0.20	0.036	1.71	3.11	5.1
7020/2	Baug Øst 1 - Ørret 2.5	0.90	1.00	1.00	0.50	0.50	1.00	0.30	0.068	1.2	7.25	3.59
7121/11	Baug Øst 2 - Ørret 2.5	0.90	1.00	1.00	0.50	0.50	1.00	0.35	0.079	0.54	0.91	1.47
7121/11	Baug Øst 3 - Ørret 2.5	0.90	1.00	1.00	0.50	0.50	1.00	0.35	0.079	1	1.68	2.61
7020/1	Baug Vest - Ørret 2.5	0.90	1.00	1.00	0.50	0.50	1.00	0.30	0.068	0.57	2.34	5.44
7020/1	Råseil - Ørret 3	0.90	1.00	1.00	0.45	0.50	1.00	0.40	0.081	0.67	1.37	2.5
7020/1	Råseil - Ugle Fm/Bjarmeland?	0.70	1.00	1.00	0.45	0.50	1.00	0.40	0.063	0.22	0.97	2.23
7020/1	Skrog - Ugle Fm/Bjarmeland?	0.70	1.00	1.00	0.45	0.50	1.00	0.20	0.032	1	11	27.1
	All values in %-factor. Recovery factor = 30 %.											

Table 6: Summary of recoverable oil volumes and risk for the identified prospectivity within PL696.